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the sequence may be included: the relative power and rate of division among them; the occurrence of the most satisfactory food conditions; specific excretion products, modifying the character of the water.

Fine (in the same Journal) makes a study of the chemical properties of the hay infusions and concludes that there is no intimately mutual relation between the sequence of the protozoa and the course of titratable acidity produced by the action of bacteria on the acid-yielding materials of the infusion.

#### INTERNAL FACTORS INFLUENCING SEX IN HYDATINA SENTA

Schull (Jour. Exp. Zool., Feb., 1912), summarizes some studies on the life cycle of *Hydatina senta*, as follows:

1. Long continued parthenogenesis is accompanied by a progressive decrease in the proportion of male-producers.

2. A similar decrease occurs in the size of family produced,—tho the author states that there seems to be no correlation between these two declines.

3. Individuals hatched from fertilized eggs are not only all females, but are all female-producers.

4. The sex is determined a generation in advance. That is to say, whether a given female is to be a male-producer or a female-producer (so far as the manure culture is concerned) is irrevocably decided during the growth period of the parthenogenetic egg from which the female hatches.

#### REINVIGORATION OF PARTHENOGERIC STRAINS OF HYDATINA

Whitney (Jour. Exp. Zool. Apr., 1912), finds in strains of this organism whose reproductive powers had declined thru 384 parthenogenetic generations, extending over a period of 29 months, that *inbreedings* of closely related individuals produced a slight increase in their reproductive powers; that *cross-breeding* of two such weakened races (altho originally derived parthenogenetically from the same stock) produced a sudden and pronounced increase in the rate of reproduction of the ensuing race.

#### CAN SPERM CELLS DEVELOP WITHOUT THE EGG?

Loeb and Bancroft (Jour. Exp. Zool. Apr., 1912), raise this interesting question and undertake to nurture spermatozoa in cul-